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ABSTRACT

This document reports on the Long-Range Plan for Technology, 1996-2010 for the state of Texas. At the beginning of the report, is a list of the members of the Task Force on Technology and a schedule of meetings, followed by the Vision of Technology in Education, 2010. The next part of the report is "The Need to Update the '1988-2000 Long-Range Plan for Technology of the Texas State Board of Education.'" Although the plan's accomplishments are considerable, a number of factors compel a reexamination of its goals and recommendations. These factors include changes in each of the following areas, which are addressed separately: State Legislation; Federal Legislation; Developments in Technology; Business and Industry Expectations; Climate of Texas Schools; Higher Education; Community Needs; and Lessons Learned Since 1988. Next is the "Long-Range Plan for Technology, 1996-2010' Requests to the Texas Legislature, Actions, and Recommendations." The Requests, and the Actions by the Texas Education Agency and Recommendations are presented for each of four areas, delineated by time period (1997-1998, 1999-2002, and 2003-2010): Teaching and Learning; Educator Preparation and Development; Administration and Support Services; and Infrastructure for Technology. Each area includes an Executive Summary. An Appendix includes a history and timeline of events and accomplishments of the Long-Range Plan, and a chart of the Current Status of Technology Initiatives. (AEF)

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LONG-RANGE PLAN FOR TECHNOLOGY 1996-2010

A Report to the 75th Texas Legislature from the State Board of Education

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LONG-RANGE PLAN FOR TECHNOLOGY, 1996-2010

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SCHEDULE OF MEETINGS

September 13 - 14, 1995	Task Force Meeting
October 13, 1995	State Board of Education Meeting
December 30 - January 1, 1996	Task Force Meeting
January 12, 1996	State Board of Education Meeting
January 25-26, 1996	Task Force Meeting
February 16, 1996	State Board of Education Meeting
February 20-21, 1996	Task Force Meeting
March 19, 1996	Steering Committee Meeting
April 12, 1996	State Board of Education Meeting
April 18, 1996	Steering Committee Meeting
May 3, 1996	Steering Committee Meeting
May 10, 1996	Steering Committee Meeting
May 17, 1996	State Board of Education Meeting
May 21, 1996	Task Force Meeting
May 30, 1996	Steering Committee Meeting
July 17, 1996	Steering Committee Meeting
August 21, 1996	Task Force Meeting
August 27, 1996	Steering Committee Meeting
August 29, 1996	Steering Committee Meeting
September 9, 1996	Steering Committee Meeting
October 10, 1996	State Board of Education Meeting
October 14, 1996	Steering Committee Meeting
November 8, 1996	State Board of Education Meeting

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VISION OF TECHNOLOGY IN EDUCATION, 2010

"We don't buy glasses; we buy vision. We don't buy awnings; we buy shade. We don't buy a newspaper; we buy information. It isn't the product we want. It's what the product will do for us. We buy something or pursue something, not because we want the thing itself, but because we want what that thing will give us or do for us."

Max Anders in The Good Life: Living With Meaning in A "Never Enough World"

Imagine a home...

...where every parent — regardless of native language or socioeconomic background — can communicate readily with teachers about children's progress, improve parenting skills, and get a degree or job training without leaving home or work.

Imagine a school...

...where every student — regardless of zip code, economic level, age, race or ethnicity, or ability or disability — can be immersed in the sights, sounds, and languages of other countries; visit museums; research knowledge webs from the holdings of dispersed libraries, and explore the inner workings of cells from inside the cell or the cold distance of outer space from inside a virtual* spacesuit.

Imagine a district...

...where every educator — regardless of subject, experience, or district location, size or wealth — can get hands-on training instantaneously, when or where he or she needs it; interact with a virtual community of professional colleagues; and have access to financial data and student performance information as well as the analytical tools to use them effectively.

Imagine a state...

...where every community member can visit the doctor for an examination and needed laboratory tests while at home or the office; collaborate with work colleagues at distant sites about complex data sets or video graphics; search primary source materials on an event half-way around the world; and take a high school or college course with fellow students from Port Arthur to El Paso by communicating rather than commuting.

*Virtual relationships or items are based on interactions or objects or representations that are in digital rather than in physical form.

What needs to happen for these images to become a reality?

- A technology infrastructure connecting schools, colleges, medical facilities, libraries, businesses, and homes must be established.

- Successful partnerships must exist among industries, the educational system, and other public service providers so that the new technologies and their applications are available and appropriate for education — and not only for the business and entertainment markets.

- The educational system must consider extending of the traditional boundaries of the school year, scholastic age, and geographic location.

- The teaching and learning process must be receptive to a wide variety of options, including expansion of learning into the home and into the broader community, development of virtual relationships among learners, and learning through distributed synthetic environments as well as on site.

- Educators must learn to access and incorporate a wide variety of resources for instructional support, research, and administration.

- Students of all ages and backgrounds must be active in the pursuit of resources to build individual and collaborative knowledge communities.

If the images become reality, who will benefit and what will the benefits be?

Students can expect higher performance and deeper engagement in academic endeavors by accessing resources available through a variety of modalities appropriate to individual learning styles.

Parents can expect not only to participate more directly in their children's education but also to improve their own knowledge as parents and citizens.

Teachers can expect to employ a wider variety of instructional approaches by having access to professional resources and by determining when and how to receive support, staff development, and classroom information.

Administrators can expect to be more fully informed and to manage more efficiently through timely access to and analysis of information, and to assist in direct operations of schools and administrative decision-making.

Taxpayers and school board members can expect more efficient use of resources, both financial and human, and more equitable allocation of each.

Community members can be afforded the opportunity to participate in key educational and community decisions and to participate in the educational process.

Communities can maintain their integrity because of the ability to move information and not people.

The Need to Update *The 1988-2000 Long-Range Plan for Technology of the Texas State Board of Education*

Executive Summary

In accordance with legislation passed in 1985, the State Board of Education developed and adopted the *1988-2000 Long-Range Plan for Technology*. Although visionary for its time, it has become outdated in the face of a number of factors. These factors include:

- Legislation at the state and federal levels
- Developments in technology
- Increased expectations by business and industry
- Changes in the public education system
- Changes in higher education
- Community needs

Legislation. The 74th Texas Legislature passed three bills that affect state planning for educational uses of technology. Senate Bill 1 directed the State Board of Education to develop a plan for schools to acquire and use technology. House Bill 2128 established the Telecommunications Infrastructure Fund Board to establish an infrastructure among public education, higher education, libraries, and medical facilities. Finally, House Bill 85 directed the Texas Higher Education Coordinating Board to develop a master plan for distance learning.

At the federal level, Goals 2000: Educate America Act calls for participating states to improve student achievement through technology. And, the Telecommunications Act of 1996 supports schools' access to the national information infrastructure.

Developments in Technology. The major development, barely foreseen in the 1988 plan, is the growth of the Internet. Connectivity to the Internet affords educators, students, and community members a wealth of opportunities that must be reflected in the board's long-range plan for technology since connectivity affects not only technology but also the process of education. The plan also addresses advancements in multimedia technologies.

Business and Industry. Business and industry expect entry-level workers to have sophisticated technology skills. Public education and the private sector need to work together to identify and foster these skills.

Public Education. Considerable changes have taken place in the past eight years in the public education system. Among these are a significant shift toward local flexibility and a diminished state role; revision of the state curriculum, including expectations for students' proficiencies with technology; the development of the Commissioner's Plan for Information Access, which would increase educators' access to statewide education data; and, a more diverse student population with greater learning needs.

Higher Education. The *Master Plan for Distance Learning* addresses enrollment of public school students in college courses by distance. In addition, pre-service teachers must be prepared to teach the technology skills that students need.

Community Needs. Community members as well as public schools can benefit from the educational resources available through a telecommunications infrastructure.

THE NEED TO UPDATE *THE 1988-2000 LONG-RANGE PLAN FOR TECHNOLOGY OF THE TEXAS STATE BOARD OF EDUCATION*

In House Bill 1304, the 69th Texas Legislature required the State Board of Education to develop a long-range plan for technology. The resulting document, *1988-2000: Long-Range Plan for Technology*, was adopted by the board in 1988. It plotted the course for meeting educational needs through technology and for implementing the concomitant 1988-2000 changes in education.

Although the plan's accomplishments, summarized in the Appendix, are considerable, a number of factors compel a reexamination of its goals and recommendations. These factors include changes in:

- State Legislation
- Federal Legislation
- Developments in Technology
- Business and Industry Expectations
- Climate of Texas Schools
- Higher Education
- Community Needs
- Lessons Learned Since 1988

State Legislation

In 1995, the 74th Texas Legislature enacted three laws that affected the original long-range plan for technology.

Senate Bill 1

Senate Bill 1 states, "The mission of the public education system of this state is to ensure that all Texas children have access to a quality education that enables them to achieve their potential and fully participate now and in the future in the social, economic, and educational opportunities of our state and nation. The mission is grounded on the conviction that a general diffusion of knowledge is essential for the welfare of this state and for the preservation of the liberties and rights of citizens."

In order to support the diffusion of knowledge, Senate Bill 1 established Section 32.001 of the Texas Education Code (TEC) which calls for the State Board of Education to develop a plan for:

- acquiring and using technology in the public school system;
- fostering professional development related to the use of technology;

- fostering computer literacy among public school students, so that by the year 2000 each high school graduate in the state has computer-related skills that meet standards adopted by the board;
- identifying and, through regional education service centers, distributing information on emerging technology; and
- accessibility to technology by students with disabilities.

The fundamental goal of this *Long-Range Plan for Technology, 1996-2010* is to enhance students' acquisition of knowledge through technology.

Impact on the Long-Range Plan for Technology, 1996-2010. Many of the objectives set forth in Section 32.001, of the Texas Education Code were addressed in the original long-range plan for technology. Some sections of the plan, however, such as those on professional development and accessibility, need strengthening.

House Bill 2128

House Bill 2128, Section 3.606, created the Telecommunications Infrastructure Fund. Deriving revenue through the Telecommunications Utilities Account and the Commercial Mobile Service Providers Account, the fund is intended to award $150 million in grants and loans for each of the next 10 years to public schools, colleges, libraries, and telemedicine centers to:

- provide computer equipment, wiring, and infrastructure—that is, the tools, materials, training, and services— needed for distance learning* and information sharing;
- develop and deliver courses and materials by distance; and
- train teachers, faculty, librarians, or technicians.

Impact on the Long-Range Plan for Technology, 1996-2010. The expansion of the Internet and coordination of telecommunications planning among public education, higher education, libraries, and medicine are priorities of House Bill 2128 and need to be addressed in the updated long-range plan for technology.

House Bill 85

House Bill 85 directed the Texas Higher Education Coordinating Board to develop a distance learning master plan.

Impact on the Long-Range Plan for Technology, 1996-2010. As with House Bill 2128, House Bill 85 fosters closer coordination between public and higher education for distance delivery of courses, materials, and professional development.

*Distance Learning is that in which some materials and/or participants are not local.

Federal Legislation

Goals 2000: Educate America Act

Section 317 of Goals 2000 legislation, passed by the U.S. Congress in 1994, calls for state planning to improve student achievement by integrating technology into curriculum. The Goals 2000 Plan calls for a task force to describe:

- requirements for introducing state-of-the-art technologies into classrooms and school libraries;
- advanced technologies' enhancement of student learning;
- support for the national education goals;
- professional development;
- meeting the needs of low-income children through technology;
- use of existing telecommunications infrastructure;
- assessment;
- purchase of equipment by local education agencies;
- cooperation with the private sector and telecommunications entities; and
- promotion of adult literacy.

Impact on the Long-Range Plan for Technology, 1996-2010. This legislation led to Commissioner of Education Mike Moses to appoint of the Texas Task Force on Educational Technologies to reexamine the State Board of Education's original long-range plan for technology. The objectives of federal legislation address specific segments of the K-12 population and include communities and other entities in the scope of those who will be served by technology.

Telecommunications Act of 1996

In January 1996, the U.S. Congress passed telecommunications reform legislation. It included specific provisions to ensure affordable telecommunications access for America's schools and libraries to the national information infrastructure.

Impact on the Long-Range Plan for Technology, 1996-2010. The federal legislation emphasizes the importance of telecommunications for all schools and libraries and offers the telecommunications industries the opportunity to restructure and expand their services. The long-range plan for technology must attend to the national focus on universal connectivity while allowing flexibility to schools as the telecommunications landscape develops and evolves.

Developments in Technology

In the eight years since the adoption of the original long-range plan for technology, many technological advances have occurred. High-performance computers and communications equipment today are smaller, more powerful, and more capable of performing expanded tasks than was the case with 1988 technology. Examples include desktop computers capable of delivering multimedia services such as sound and moving images. Furthermore, equipment costs have decreased as various forms of technology have reached critical mass by entering the business and home markets.

If a keyword in the previous decade was "computers," the keyword in the 1990s is "connectivity."

With connectivity comes the opportunity for teachers to explore the Internet, expand distance learning, participate in professional development by distance, and transfer data electronically. Connectivity can allow learning to occur in different and nontraditional ways, expanding the number and types of learners. Other applications of new and emerging technologies — virtual reality and virtual relationships, knowledge webs, shared synthetic environments, and distributed learning and experiences — are illustrated in the "Vision of Technologies in Education, 2010," section on page 1 of this document.

Impact on the Long-Range Plan for Technology, 1996-2010. While the *1988-2000 Long-Range Plan for Technology* was visionary for its time, changes caused by the emergence of new technologies and cost-effective use of existing technologies create a need to examine their use in Texas schools. As projected in the original plan, instructional methods evolve as technology is infused into the educational environment. Thus, the new plan addresses both emerging technologies and the impact they have on pedagogy.

Business and Industry Expectations

Businesses of all sizes increasingly automate and computerize many functions. These include designing and manufacturing, analyzing sales and marketing information, sharing data over long distances among separate facilities, developing multimedia presentations, and using the Internet for a multitude of purposes, including advertising, promotions, and sales. To remain competitive and efficient in the world marketplace,

employers now demand sophisticated technology skills, even of entry-level employees.

Impact on the Long-Range Plan for Technology, 1996-2010. Young people must become experienced with the technologies used by business and industry. This plan must work with the private sector to articulate industry's expectations, to project future needs, and to encourage cooperation between public education and the private sector.

Climate of Texas Schools

Local Flexibility

With the passage of Senate Bill 1 in 1995, authority and accountability shifted to local authorities. The original long-range plan, written in a time of centralization, was prescriptive in nature. Therefore, an updated long-range plan is needed to provide leadership, allow flexibility, and be more closely aligned with local control. The plan can provide assistance to schools for local policy development and decision-making to best fit district needs.

Essential Knowledge and Skills

Senate Bill 1 also called for the development of Essential Knowledge and Skills to replace the Essential Elements adopted in 1984. This effort, begun in 1995 and projected to conclude with Board adoption in 1997, incorporates high expectations for students' use of computers, telecommunications, and other technologies. These expectations will not only allow students to access and analyze information, thus increasing learning power, but they will also foster the occupational skills called for by the private sector. This updated long-range plan for technology must support these expectations by providing both the infrastructure and the training that schools and educators need.

Commissioner's Plan for Information Access

The state's Public Education Information Management System (PEIMS), begun in 1988, has established a comprehensive database of information about public education. Access, however, is still highly limited.

The Commissioner's Plan for Information Access will capitalize on the success of PEIMS by bringing easy-to-use information to the classroom teacher. It will provide decision support systems to school administrators, school boards, and other policymakers. The updated technology plan encompasses the plan for information access.

Student Population

The face of education in Texas has changed since 1988. The Texas student population is growing rapidly, from 3.2 million in the 1989-90 school year to 3.67 million in 1994-95. Current projections place the number of Texas students at more than 4.1 million by the year 2001.

As it grows, Texas' student population is becoming more diverse. In the 1990-91 school year, racial and ethnic minority children became the majority student population in Texas. By 1994-95, they accounted for almost 53 percent of students. Hispanics are the fastest-growing student group, accounting for 70 percent of the annual enrollment growth. Enrollment in bilingual programs is expected to increase by 50 percent by the 2000-01 school year.

In terms of annual growth by grade, the greatest increase in student enrollment has occurred in pre-kindergarten, which serves limited-English proficient and low-income students. More than 46.3 percent of the state's students are economically disadvantaged.

Impact on the Long-Range Plan for Technology, 1996-2010. The updated long-range plan for technology must reflect these multiple developments. The plan recommends flexible paths for school policymakers and personnel to consider but does not presume a consistent pattern of development and use across the state.

Because of the comprehensive revision of the curriculum and the concerted effort to incorporate technology applications and skills, the original long-range plan for technology provides for the infrastructure necessary to meet teachers' and students' curricular needs. A fundamental aspect of this revised plan is the expansion of this infrastructure beyond that which was understood in 1988 to that which is necessary through the first decade of the 21st century.

The plan also encourages coordination across all education programs for all learners, regardless of their ages, disabilities, or learning styles. Technology plays a particularly critical role in meeting the needs of students with disabilities. Technology use needs to be a part of a core curriculum for such students so that they, like all students, can be prepared to use appropriate applications in higher education and the workforce. In addition, assistive technologies can help students with disabilities acquire the intellectual, academic, problem-solving, and other skills that all children are expected to learn in school. Board-adopted instructional materials, including electronic ones, and information delivered by technology must be accessible for all students and teachers. In addition, teachers—both those of students with disabilities and those who

themselves have disabilities—must receive training in selecting and using appropriate technologies.

Above all, the board's technology plan for 1996-2010 must ensure equitable access by all students to both the technology infrastructure and to the learning resources that it provides. A critical element of the original plan was the role that technology, equitably distributed, can play in addressing economic and other disparities among students. This goal is no less critical in the plan for 1996-2010.

Higher Education

Institutions of higher education in the state prepare more than 85 percent of the teachers in Texas classrooms. The ability of new teachers to incorporate technology use appropriately into instruction depends in large part on the training they receive in their pre-service education. The Texas Higher Education Coordinating Board's *Master Plan for Distance Learning* addresses the sharing of library resources, distance enrollment of high school students in college courses, and integration of technology into teaching and learning.

Impact on the Long-Range Plan for Technology, 1996-2010. Students graduating from Texas high schools must be prepared with the technology skills they will need in colleges and universities. Also, because pre-service teachers need to be prepared to use technology when they enter the classroom, recommendations are made in the updated plan regarding teacher preparation. The plan also recommends ongoing coordination by all institutions and levels of education to ensure the sharing of resources and expertise and the efficient and effective use of telecommunications.

Community Needs

Parents of school-age children are encouraged to become involved in their children's education. Telecommunications technologies offer multiple ways for this involvement to occur. Examples range from teachers electronically sharing homework assignments with parents to parents viewing classroom activities from a distance or electronically receiving parent education programs.

Other adults might also benefit from educational programs that are enhanced or delivered by technology. Literacy programs are an example. According to the Texas Adult Literacy Survey conducted in 1992, as many 28 percent of adults in the state (approximately 3.5 million people)

function at the lowest level of literacy, able to accurately perform only limited daily tasks.

Impact on the Long-Range Plan for Technology, 1996-2010. School- or community-based technology programs can deliver adult education, provide professional development, and accelerate adult learning. Cooperative planning between schools and their communities can inform parents of their children's educational progress, involve parents in their own educational programs, and expand the efficiency and use of school- or community-based technology centers.

Lessons Learned Since 1988

Perhaps the strongest needs compelling revision of the *1988-2000 Long-Range Plan for Technology* are the lessons learned since its inception. According to research conducted in 1996 by the Texas Center for Educational Technology to inform the development of the revised plan, school districts report that the following factors are critical:

1. collaborative planning
2. technology integration
3. financial support
4. combination of funds, knowledgeable people, and a thoughtful plan
5. comfort with technology
6. continual support
7. slow pace
8. teacher commitment
9. revised personnel units
10. professional development

Impact on the Long-Range Plan for Technology, 1996-2010. The following plan incorporates these lessons.

Long-Range Plan for Technology, 1996-2010: Requests to the Texas Legislature, Actions, and Recommendations

In order to achieve the Vision of Technology in Education in 2010 and to meet the needs delineated above, the *Long-Range Plan for Technology, 1996-2010* consists of three types of procedures for implementation. The plan:

- makes Requests to the Texas Legislature,
- states Actions that will be taken by the Texas Education Agency, and
- proposes Recommendations to other entities. These entities include other state agencies, regional education service centers, local education agencies, institutions of higher education, communities, and the private sector.

The Requests to the Texas Legislature, Actions by the Texas Education Agency, and Recommendations to other entities concentrate on four areas:

- Teaching and Learning
- Educator Preparation and Development
- Administration and Support Services
- Infrastructure for Technology

In addition, Legislative Requests, Actions, and Recommendations are established for three time periods:

1. Short-term: 1997-1998
2. Mid-term: 1999-2002
3. Long-term: 2003-2010

Following are the Requests to the Texas Legislature and the Actions and Recommendations for each of the four areas, delineated by time period. Each area is introduced by an Executive Summary.

REQUESTS TO THE TEXAS LEGISLATURE

EXECUTIVE SUMMARY

In the past eight years, the Texas Legislature has accomplished a number of significant actions to support the integration of technologies into public and higher education. Among the highlights are the following achievements:

- established the Technology Allotment, which currentlyprovides $30 per student to every school district for professional development and acquisition of hardware and software;
- establishment of the Telecommunications Infrastructure Fund to provide hardware, wiring, materials, and training for telecommunications installation and development over the next 10 years;
- directing the Texas Higher Education Coordinating Board to develop a master plan for distance learning; and
- directing the State Board of Education to develop an educational technology plan.

These actions join others in helping Texas become a national leader in educational uses of technology and telecommunications.

In taking full advantage of these legislative actions, the Texas Education Agency has:

- focused on equity in resource sharing;
- ensured comprehensive opportunities for distance learning;
- encouraged innovative uses of technology by schools, and;
- coordinated with other state agencies and institutions of higher learning.

State implementation of legislative directives and fiscal support is illustrated in the "Accomplishments of the *1988-2000 Long-Range Plan for Technology of the State Board of Education*" in this document's Appendix. This implementation has not only helped to provide the boxes and wires that undergird communications but has also enhanced instruction by classroom teachers, enriched students' learning, and touched the lives of parents.

The Texas Legislature can play a similarly critical role in bringing to life the *State Board of Education Long-Range Plan for Technology, 1996-2010.* Legislative requests address four key areas:

- Infrastructure for Technology,
- Teaching and Learning,
- Educator Preparation and Development, and
- Administration and Support Services.

Infrastructure for Technology.
A comprehensive state technology system, networked among a multiplicity of entities to carry voice, video, and data, must be established. Such an infrastructure is fundamental to the long-range plan. In fact, it is fundamental to all of public and higher education as well as to the provision of many state services.

The priority in this plan for technology is public education. To have adequate access to

this network, each educator* in Texas needs his or her own computer workstation.† Students, too, need their own workstations. In the near term, the ratio is three students per workstation. Ultimately, each student will need individual access.

Schools can acquire the connections and workstations by purchase, lease, or other arrangements. It is proposed that the Permanent School Fund Insurance Program guarantee financing of such technology projects. This help to the schools would be accomplished at no projected cost to the state.

Teaching and Learning.
The infrastructure, while fundamental, merely provides *access* to information. In classrooms, it is the informational *resources* available through the technology infrastructure that will make the difference.

Like textbooks, technology-based materials must be instructionally sound and meet the learning needs of all students. To help ensure the quality of informational resources, technology initiatives and partnerships with providers of educational materials should receive continuing support.

Support of the Commissioner's Plan for Information Access will help ensure this access. Educators need access to educational accountability and other data for successful planning and instruction.

Ultimately, with distance learning and outreach to adult learners well established, funding formulas may need review and revision.

Educator Preparation and Development.
Continual advancements in technologies mean that educators — even those well supplied with hardware and software — are rarely sufficiently prepared to take advantage of the instructional and management opportunities provided by technology.

All educators need paid professional leave time for training in integrating technologies into teaching and learning, instructional management, professional development, and administration. In addition, those who provide the training must be professionally qualified to help educators learn to apply systems in their particular areas of specialty.

This staff development is not merely short-term. Instead it is re-tooling a statewide workforce of more than 250,000 professionals. Funds are requested to meet these professional development needs. In addition, incentives are sought to encourage preparation of teachers-in-training at higher education institutions in appropriate uses of technology.

Administration and Support Services.
Legislative action in regard to administrative uses of technologies focuses on the Public Education Information Management System (PEIMS). Currently, school districts provide at least a portion of the cost of PEIMS preparation. Support for this function should be returned to the regional education service centers. The next step is to redesign PEIMS to take advantage of the state comprehensive infrastructure and the Commissioner's Plan for Information Access by reducing paperwork and improving access to non-secure data. This will require legislative action in the mid-term. Ultimately, long-range technology planning

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* Educator - Professional staff at or affiliated with a public school or district, including teachers, administrators, curriculum coordinators, librarians, and others.

† Workstation - (Educator) A computer with transmission, productivity, and presentation capabilities for use by educators in teaching, management, and other professional tasks; can be desktop and/or portable, at local discretion.
(Student) A computer with a range of capabilities, depending on local priorities, for use by students in classroom, library, or home.

can be incorporated into general educational planning at the state level.

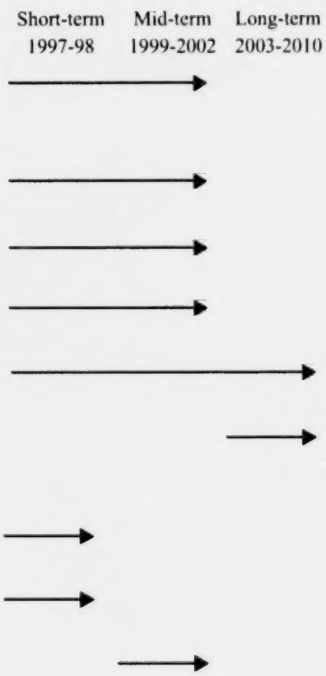
The Requests to the Legislature that follow vary in their fiscal impact. Some have no impact on the state. Others will reduce costs to schools; still others could, potentially, entail significant financial impact at the state level and, possibly, at the local level as well. The goals of preparing the citizens and workforce of the next century make these effects necessary and worthwhile.

Support for those goals that have fiscal impact can come from a variety of sources. The Technology Allotment and the Telecommunications Infrastructure Fund can both be directed for infrastructure, training, or other purposes related to this plan. Incentives can also be developed to encourage application of these funding sources for these purposes. To meet the state's infrastructure and training needs, however, additional sources of funds may need to be sought.

REQUESTS TO THE TEXAS LEGISLATURE

Infrastructure for Technology

LEG.IT.1-9



.1 Recognize the need for a comprehensive state technology system, with voice, video, and data capabilities, with a priority on public education, by 2002

.2 Recognize the need to provide a workstation to educators at an educator-to-workstation ratio of 1:1

.3 Recognize the need to provide a workstation to students at a student-to-workstation ratio of 3:1

.4 Recognize the need for a video teleconferencing unit for every campus

.5 Maintain the Technology Allotment at least at its current level

.6 Recognize the need for full funding to support the comprehensive state technology system and a student-to-workstation ratio of 1:1

.7 Provide for technology financing guaranteed by the Permanent School Fund Insurance Program

.8 Establish tax incentives for the private sector to share services and current technology

.9 Increase funding to meet technology costs in state facilities program

Teaching and Learning

LEG.TL.1-5

.1 Use general revenue to support Texas Education Agency statewide technology initiatives

.2 Support partnerships with providers of instructional products and services to secure rights and cost efficiencies for Texas schools

.3 Remove remaining impediments to district use of electronic materials through textbook funds

.4 Modify other formulas to recognize impact of distance learning and technology

.5 Establish tuition-based or other funding mechanism for access to pre-kindergarten through grade 12 learning for adult learners

	Short-term 1997-98	Mid-term 1999-2002	Long-term 2003-2010
Educator Preparation and Development			
LEG.EPD.1-4			
.1 Provide new funding for professional development days in integrating technology into instruction, staff development, and administration	→		
.2 Support provision of training for educators in integrating technology into teaching and learning, instructional management, professional development, and administration	→		
.3 Provide incentives for increased commitment of state and local funds for technology-related professional development	→		
.4 Provide incentives for educator preparation institutions that provide field-based experiences in settings that integrate technology into instruction	→		
Administration and Support Services			
LEG.ADSS.1-4			
.1 Provide for the Commissioner's Plan for Information Access	→		
.2 Restore regional education service center funding for the Public Education Information Management System (PEIMS)	→		
.3 Redesign PEIMS with state funding for data collection		→	
.4 Eliminate the requirement for a separate state level long-range plan for technology and incorporate technology planning into the State Board of Education Long-Range Plan for Public Education			→

TEACHING AND LEARNING

EXECUTIVE SUMMARY

The Teaching and Learning component of this document focuses on the instructional needs of teachers and the learning needs of students in meeting the vision of technology in education. Tools need to be appropriately acquired, accessed, and integrated to enhance academic achievement of all Texas students in all aspects of instruction.

This plan recognizes the need for graduates to demonstrate mastery of technology conveyed in the Texas Essential Knowledge and Skills (TEKS) as both a course of study and as applied in other content areas. Students today need appropriate technological skills and knowledge to achieve academic success and to become productive members of society.

Over the past decade, these skills have become more complex. Citizens must now have the expertise to interact with and to compete in a global society. This long-range plan directs the Texas Education Agency and provides recommendations for districts and campuses to help schools and communities meet these technology needs.

Technology for Teachers and Learners

The teacher-learner relationship in our schools is evolving and will remain important over the duration of this plan. Learners across the state gain access to learning opportunities when teachers have the incentives, expertise, resources, and human support to feel confident in their own technology skills and to provide opportunities to students.

The Texas long-range plan for technology embraces the belief that, before technology can significantly improve learning, teachers must first be competent with the technology applications that facilitate their work and support student learning.

Short-term (two-year) initiatives in Teaching and Learning focus on:

- meeting students' learning needs through distance learning and other technologies,
- clarifying the technology proficiencies expected of students and teachers,
- highlighting effective practices,
- establishing partnerships to provide tools and services, and
- encouraging effective planning.

These initiatives will build on the technology-based experiences begun under the previous long-range plan for technology and extend them into the mid-term (the following four years) and beyond.

The mid-term actions and recommendations strengthen teachers' and students' skills by:

- fostering the development and integration of rigorous TEKS into technology-related classroom activities and into electronic instructional materials,
- developing state accountability measures,
- encouraging regional service centers and state and local partnerships with commercial concerns to develop products appropriate for Texas schools, and

- continuing to encourage effective local planning.

Initiatives for the long term sustain and extend attention to teachers and students. At the same time, they define a new focus on parent involvement in planning for technology, using technology based educational resources, and addressing the needs of the larger community.

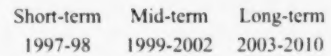
Community Involvement
At each stage, actions are recommended to other state agencies, regional education service centers, schools, communities, institutions of higher education, and the private sector. Each has a role to play in building education and students' technology proficiencies and in fostering technology integration to meet the ultimate goal of increased student achievement.

Integration of Technology
The state's current initiative to redefine the curriculum by specifying essential knowledge and skills across all discipline areas offers a rare opportunity to position technology as it should be — integrated into all aspects of teaching and learning for all students and teachers. The Teaching and Learning Actions and Recommendations, along with the other three critical components, contribute toward meeting the vision for technology use in education by ensuring appropriate application of technology in the TEKS as well as TEKS-driven training, instructional materials, and assessment.

TEACHING AND LEARNING

ACTIONS AND RECOMMENDATIONS

State



Actions by the Texas Education Agency

TL.TEA.1-11/27

.1 Develop and adopt Texas Essential Knowledge and Skills (TEKS)* that integrate technology into teaching and learning in all areas

.2 Implement and update TEKS that integrate technology into teaching and learning

.3 Adopt instructional materials that integrate technology into the Texas Essential Knowledge and Skills

.4 Ensure that instructional materials are accessible by all students and educators

.5 Establish expectations for technology proficiencies by educators

.6 Develop standards for measuring and reporting the extent to which educators meet the technology proficiencies

.7 Update expectations for technology proficiencies by educators and revise standards for measurement and reporting

.8 Reflect the expectations for technology proficiencies by educators in teacher appraisal and in the Academic Excellence Indicator System (AEIS) through measuring, analyzing, and reporting results

.9 Establish expectations for technology proficiencies by students in kindergarten through grade 12, including computer-related skills that meet standards for each high school graduate by the year 2000 (TEC 32.001)

.10 Update expectations for technology proficiencies by students

.11 Reflect the expectations for technology proficiencies by students in student assessment and in AEIS through measuring, analyzing, and reporting results

*Texas Essential Knowledge and Skills (TEKS) are statements of knowledge and skills and of Performance Descriptions that, in accordance with state statute, will be adopted by the State Board of Education to replace the essential elements. Knowledge and Skills address what all students should know and be able to do. Performance Descriptions are explanations of how students can demonstrate the knowledge and skills they have acquired.

State (cont'd)

	Short-term 1997-98	Mid-term 1999-2002	Long-term 2003-2010
Actions by the Texas Education Agency (cont'd)			
TL.TEA.12-24/27			
.12 Provide support for distance learning and distributed learning* to equalize learning opportunities for students and educators	→	→	→
.13 Review and, if necessary, revise policies regarding student credit in distance and distributed learning courses		→	
.14 Develop and incorporate a standardized instructional planning format into the teacher technology system so that teachers can electronically share instructional approaches			→
.15 Encourage, coordinate, and support quality planning by school districts	→	→	→
.16 Initiate and implement partnerships with providers of instructional products and services to secure rights and cost efficiencies for Texas schools and to ensure Texas' participation in content development	→	→	→
.17 Provide educators access to use and contribute to an on-line consumers' guide to technology-based instructional materials	→	→	→
.18 Arrange for an external review of state education technology initiatives for expansion, maintenance, revision, or deletion, and make recommendations to the legislature		→	
.19 Identify, communicate, and reward best practices of technology integration into teaching and learning	→	→	→
.20 Continue to fund and foster innovative practices in the use of technology in teaching and learning	→	→	→
.21 Foster innovation in using technology to assess, document, and report student progress		→	→
.22 Continue to provide research and development for learning, staff development, community education, staffing, and organization of learning environments with technology	→	→	→
.23 Participate with the Texas Higher Education Coordinating Board in the evaluation of procedures for concurrent enrollment of high school students	→	→	→
.24 Coordinate provision of adult literacy services to adult learners with libraries and other providers		→	→

* Distributed learning is learning engaged in by students, educators, staff, community members, or others with the support of telecommunications technologies at a school, home, business, or another site.

State (cont'd)

	Short-term 1997-98	Mid-term 1999-2002	Long-term 2003-2010
Actions by the Texas Education Agency (cont'd)			
TL.TEA.25-27			
.25 Make pre-kindergarten through Grade 12 education available to the community through technology supported distributed learning			→
.26 Establish and communicate expectations for parents' and communities' use of infrastructure for access to learning resources		→	→
.27 Communicate policies and recommendations of the *Long-Range Plan for Technology, 1996-2010*	→	→	→
Recommendations to State Board for Educator Certification			
TL.SBEC.1			
.1 Establish certification standards for technology proficiencies by educators in teaching and learning, instructional management, professional development, and administration		→	→

Regional

Recommendations to Regional Education Service Centers			
TL.RESC.1-8			
.1 Establish and provide a menu of services for schools to support implementation of the *Long-Range Plan for Technology, 1996 - 2010* and of regional and local technology initiatives	→	→	→
.2 Disseminate information and offer staff development on technology integration into the curriculum, including the Texas Essential Knowledge and Skills and expectations for technology proficiencies for educators and students	→	→	→
.3 Distribute information and offer training related to the best practices for technology planning and use of technology in teaching and learning	→	→	→
.4 Participate in partnerships to develop instructional materials and services	→	→	→
.5 Provide to educators and students facilitated preview of learning resources, especially those provided through state licenses and adoptions	→	→	→
.6 Assist schools in developing and implementing strategies to meet the Performance Descriptions in the TEKS	→	→	→
.7 Offer technical assistance for technology planning	→	→	→
.8 Disseminate information about regional industry needs for graduates' technology skills		→	→

Local (cont'd)

	Short-term 1997-98	Mid-term 1999-2002	Long-term 2003-2010
Recommendations to Local Education Agencies			
TL.LEA.1-18			
.1 Develop strategies to meet Performance Descriptions for students in the TEKS and to establish technology proficiencies for educators	→		
.2 Increase students' technology proficiencies	→	→	→
.3 Increase educators' effectiveness in using technology	→	→	→
.4 Increase academic performance across the curriculum through technology	→	→	→
.5 Integrate technology into teaching and learning in all areas	→	→	→
.6 Integrate ongoing planning for technology into all classroom, campus, district, and community planning	→	→	→
.7 Ensure accessibility by all students to technology-based instruction and to adaptive/assistive devices, as appropriate	→	→	→
.8 Use student performance data and curriculum materials that are provided and managed electronically in instructional planning	→	→	→
.9 Pilot assessment of models for reporting the extent to which students meet the technology proficiencies in the TEKS		→	
.10 Incorporate technology use into the teacher appraisal system, where appropriate			→
.11 Assess and report the extent to which students meet technology proficiencies in the TEKS			→
.12 Incorporate expectations for educators' and students' technology proficiencies into local accountability systems			→
.13 Use distance learning and distributed learning for expanding curricular offerings and meeting the needs of homebound and other students	→	→	→
.14 Use distance learning to provide educational services and information about education to parents and other community members			→
.15 Provide access by staff and students to the best available electronic information resources in classrooms, libraries, and other appropriate sites	→	→	→
.16 Identify and communicate the best technology practices to the community	→	→	→
.17 Provide incentives for use of new effective models, tools, and resources for teaching and learning	→	→	→
.18 Provide parents and other community members access to the infrastructure for educational resources		→	→

Local (cont'd)

	Short-term 1997-98	Mid-term 1999-2002	Long-term 2003-2010
Recommendations to Communities			
TL.COM.1-3			
.1 Access existing and emerging networks for educational services and information		→	
.2 Participate in establishing and updating expectations for students' and educators' technology proficiencies and in developing effective reporting and communications systems	→	→	
.3 Participate in teaching and learning opportunities and in the use of other educational resources available through the telecommunications infrastructure			→

Higher Education

Recommendations to Institutions of Higher Education			
TL.IHE.1-7			
.1 Provide professional development to faculty engaged in educator preparation in integrating technology into teaching and learning	→	→	
.2 Demonstrate the best practices and models of technology integration into teaching and learning and make them available for viewing by schools	→	→	
.3 Expand collaboration between public schools and educator preparation entities	→	→	
.4 Participate in partnerships with schools to pursue grant opportunities	→	→	
.5 Participate in partnerships with the private sector and public entities to develop and provide instructional materials and services	→	→	
.6 Deliver professional development and degree programs for staff and dual credit for students through distance learning and distributed learning	→	→	
.7 Share library and information resources with schools and communities	→	→	

Private Sector

	Short-term 1997-98	Mid-term 1999-2002	Long-term 2003-2010
Recommendations to the Private Sector			
TL.PS.1-6			
.1 Collaborate with schools on establishing and updating expectations for technology proficiencies in the TEKS for students	→	→	→
.2 Collaborate with schools on establishing and updating expectations for technology proficiencies for educators	→	→	→
.3 Participate in partnerships to develop and provide products, materials, and services that ensure rights and cost efficiencies for schools and that ensure Texas' participation in content development	→	→	→
.4 Invite educators, students, and parents to experience technology's role in the workplace	→	→	→
.5 Provide technology-based work experience for educators and students through internships and other means	→	→	→
.6 Support communication of the policies and recommendations of the *Long-Range Plan for Technology, 1996 - 2010*	→	→	→

Educator Preparation and Development

Executive Summary

Research on successful professional development reveals that all members of an institution must share a common understanding of the goals and knowledge base in order for the institution to improve. As a result, the *Long-Range Plan for Technology, 1996-2010* addresses the staff development needs not only of teachers but of all the members of the professional education community.

At the public school level, these include teachers, administrators, curriculum coordinators, counselors, librarians, and other educational professionals. The plan also addresses the training needs of faculty at the university level, particularly those involved in pre-service educator preparation.

Retraining is a Priority

To provide quality education to all learners, the training and retooling of the current educator workforce in using technology tools to teach and learn must be identified as a priority. In addition, technology can and should be used to provide equitable access to quality, standards-based professional development.

All pre- and post-service educator preparation personnel must possess and demonstrate the capacity to use technologies effectively in all facets of their professional duties. These include personnel at colleges and universities, at Centers for Professional Development and Technology, and at other organizations that offer training to teachers.

To use technologies effectively, pre-service and educator preparation personnel must continually:

- learn about current educational technologies and their applications,
- develop planning skills for and through technology use,
- integrate educational technologies throughout the entire teacher preparation program,
- model the best practices regarding the effective integration of educational technology throughout the curriculum,
- learn about new technologies,
- integrate technologies appropriately into their teaching, and
- use technology to increase their knowledge, to seek expert advice, and to collaborate.

Higher education faculty should be encouraged to expand their technology skills for instructional purposes. Thus, the State Board for Educator Certification is asked to establish requirements in technology proficiencies for both educator preparation and educator renewal.

Just-in-Time Professional Development

When they have a concern about instruction or management, educators need immediate access to relevant, high-quality professional development and technical support both during and outside the instructional day. This type of professional development is known as "just-in-time" rather than "just-in-case" assistance.

Just-in-time professional development rejects the standard of often irrelevant or ill-timed professional development presented just in case one ever needs it. It replaces this with a new standard for professional development, one that is on demand and just in time for effective use. All educators should have cost-effective access to high-quality information regardless of geographic location or time of day. Technology makes this feasible.

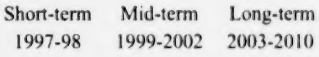
State, regional, and local institutions as well as the private sector all play a role in developing, facilitating, and providing this model of professional development. Significant coordination among these entities and allocation of resources will be necessary to train the educator workforce in integrating technologies into all facets of instruction, management, and planning.

The Actions and Recommendations in this document's "Educator Preparation and Development" section on page 33 set the stage for providing educators with the technology proficiencies, cited in the "Teaching and Learning" section, that they need to make full use of the technology infrastructure in teaching, managing, and in their own learning.

EDUCATOR PREPARATION AND DEVELOPMENT

ACTIONS AND RECOMMENDATIONS

State



Actions by the Texas Education Agency

EPD.TEA.1-6

.1 Identify priorities for professional development activities

.2 Establish, disseminate, and update minimum standards for staff development in technology (TEC 21.451)

.3 Facilitate and provide access to professional development activities, including by distance learning

.4 Establish policies that facilitate educator professional development credit for distance learning and distributed learning

.5 Provide professional development in integration of technology into the Texas Essential Knowledge and Skills

.6 Incorporate accountability measures into the teacher appraisal system for expectations for technology proficiencies by educators

Recommendations to the State Board for Educator Certification

EPD.SBEC.1-5

.1 Design, implement, and update requirements for relevant educator preparation and development in integrating technology into teaching and learning, instructional management, professional development, and administration

.2 Incorporate standards for technology proficiencies into educator renewal requirements

.3 Establish a credential that recognizes specialization in instructional technology

.4 Update the requirements for a credential in instructional technology

.5 Evaluate Centers for Professional Development and Technology

Regional (cont'd)

	Short-term 1997-98	Mid-term 1999-2002	Long-term 2003-2010

Recommendations to the Texas Higher Education Coordinating Board

EDP.THECB.1

.1 Provide for continuing education requirements for college and university faculty in technology use for teaching and learning →

Recommendations to Regional Education Service Centers

EPD.RESC.1-5

.1 Establish and maintain partnerships in support of local technology initiatives →

.2 Offer professional development to educators on technology integration into the TEKS →

.3 Offer professional development to educators by distance learning, distributed learning, and other means →

.4 Design and implement professional development programs for educators on technology integration into teaching and learning, instructional management, professional development, and administration →

.5 Design and implement staff development for local personnel responsible for technical support →

Local

Recommendations to Local Education Agencies

EPD.LEA.1-5

.1 Allocate at least 30 percent of Technology Allotment for professional development →

.2 Provide opportunities, incentives, and support for educators to develop model practices using technology →

.3 Provide training in data examination and analysis through technology to support sound decision-making →

.4 Provide professional development on integrating technology into teaching and learning, instructional management, professional development, and administration →

.5 Integrate planning for technology into all classroom, campus, and district planning →

Local (cont'd)

	Short-term 1997-98	Mid-term 1999-2002	Long-term 2003-2010
Recommendations to Local Education Agencies			
EPD.LEA.6-7			
.6 Design and implement educator development, on site and by distance and distributed learning, to meet expectations for technology proficiencies by educators		→	
.7 Make available and provide incentives for educators to participate in distributed, just-in-time* professional development		→	
Recommendations to Institutions of Higher Education			
EDP.IHE.1-3			
.1 Design and implement educator preparation and development programs that meet state certification standards and expectations for technology proficiencies for educators		→	
.2 Support field-based educator preparation and development and use of technology in the field		→	
.3 Provide professional development to faculty engaged in educator preparation in integrating technology into teaching and learning, instructional management, professional development, and administration		→	

Private Sector

	Short-term 1997-98	Mid-term 1999-2002	Long-term 2003-2010
Recommendations to the Private Sector			
EDP.PS.1-2			
.1 Provide opportunities to educators for professional development and access to technology systems		→	
.2 Collaborate with educators in the development of products and services to meet schools' technology needs		→	

* Just-in-time professional development refers to professional development resources that are available oncall through access to formal instruction, experts online, intelligent agents, and other resources. Intelligent agents are machine-based entities that can carry out simple instructions from a user.

Administration and Support Services

Executive Summary

Technology systems provide tools for many purposes. The Actions and Recommendations for Teaching and Learning and those for Educator Preparation and Development focus on those purposes that are critical for learners — whether the learners are students, in a classroom or at a distant site, or teachers. In their roles as seekers and providers of knowledge, students and teachers alike rely on technologies for functions such as communications, research, analysis, and presentation.

Various Administrative Functions
Teachers also serve as managers of instruction. They can benefit from having access to non-secure information, made readily available electronically, about their students' strengths and needs.

Administrative and support services staff in school districts require sophisticated technological tools to accomplish their functions. These staff include those responsible for keeping track of student attendance, participation in special programs, student performance, the educational progress of mobile students, expenditures from multiple sources of funds, and local accountability information. Also included are those responsible for making decisions about food, transportation, and other services critical to the comprehensive and efficient operations of a school district.

Sharing the Challenge of Technology
The requirements of the Public Education Information Management System (PEIMS) and of the Academic Excellence Indicator System (AEIS), in particular, challenge administrative staff to take full advantage of technology tools for data gathering, analysis, and distribution. It is imperative that administrative and support staff have access to both the tools and the professional development needed to effectively and efficiently learn to use these tools.

Furthermore, the rich information available through PEIMS can and should be shared, following decisions regarding security and confidentiality, with teachers, parents, and community members. The Commissioner's Plan for Information Access, embodied in the Actions and Recommendations in this section, seeks to strengthen and standardize the data produced by districts and to make these data available not only to educators and administrative decision makers but also to parents and other constituents of the public education system.

As the technological infrastructure, described in the next section, is established, PEIMS could also be redesigned to reduce paperwork, replace some data items with sampling methods, and improve the quality and timeliness of data acquisition and transmittal. This redesign will, in turn, make the information available through PEIMS even more accessible to and useful for both instructional and non-instructional personnel.

Meeting the Challenge
To meet these needs, the state will:

- coordinate actions to standardize state information reports from districts and campuses,
- plan for and construct a revised PEIMS,
- seek ways to use technology for student assessment and record-keeping purposes, and
- provide leadership in the use of data for sound decision-making.

Regional education service centers will also play a key role. They can assist school districts with selection of and training on appropriate data systems, and with revising PEIMS.

Schools will be asked to use technology-based data systems in planning and decision-making. They can use technology to offer parents and other community members access to non-secured data.

Administration and Support Services

Actions and Recommendations

State

	Short-term 1997-98	Mid-term 1999-2002	Long-term 2003-2010
Actions by the Texas Education Agency			
ADSS.TEA.1-12			
.1 Ensure the availability of technical assistance programs to promote efficiencies in non-instructional support services through technology	→	→	→
.2 Provide leadership in examination and analysis of data to support sound decision-making	→	→	→
.3 Create a comprehensive set of standardized state information reports by district and campus	→		
.4 Plan for and construct revised PEIMS to reflect the changing role of TEA and to reduce reporting burdens on school districts	→	→	
.5 Develop and implement policies regarding information access and confidentiality	→	→	→
.6 Provide for open access to non-secured data files	→	→	→
.7 Improve mobility of information through common data standards		→	→
.8 Include assistance in planning for and integrating technology as a core area for regional education service centers	→	→	→
.9 Foster innovation in using technology to assess, document, and report student progress		→	→
.10 Establish electronic student achievement records statewide for placement and for documenting progress, especially of mobile students		→	→
.11 Design and implement initiatives for business and industry technology partnerships with education	→	→	→
.12 Modify facilities technology standards to promote future demands for access		→	→
Texas Higher Education Coordinating Board			
ADSS.THECB.1			
.1 Reduce barriers to instructional services delivered by technology through improved coordination with the Texas Education Agency, institutions of higher education, and other entities	→	→	→

Regional

	Short-term 1997-98	Mid-term 1999-2002	Long-term 2003-2010
Recommendations to Regional Education Service Centers			
ADSS.RESC.1-7			
.1 Promote local district awareness of technology resources that assist local personnel in effective planning for school improvement	→	→	→
.2 Provide technical assistance and support services to districts in selecting, securing, installing, and using technology systems to promote efficiency and effectiveness in district operations	→	→	→
.3 Assist TEA and local personnel in revising and implementing PEIMS	→	→	
.4 Conduct training programs to assist districts in using technology resources in all aspects of school operations	→	→	→
.5 Integrate support services with other community services, where appropriate		→	→
.6 Assist coordination of school-community information resources		→	→
.7 Maintain a capable and client-centered pool of expertise for supporting schools, districts, and individual staff, integrating technology into instructional management and administration	→	→	→

Local

Recommendations to Local Education Agencies			
ADSS.LEA.1-6			
.1 Integrate planning for technology into all classroom, campus, and district planning	→	→	→
.2 Integrate technology into instructional management and administration	→	→	→
.3 Initiate and implement policies regarding parents' and community members' access to personnel and non-secured data through technology		→	→
.4 Expand community access to school information through technology		→	→
.5 Establish policies to encourage expanded use of school facilities		→	→
.6 Coordinate school-community resources for technology		→	→

Local (cont'd)

	Short-term 1997-98	Mid-term 1999-2002	Long-term 2003-2010
Recommendations to Communities			
ADSS.COM.1			
.1 Seek access to educational information resources available by technology		→	

Private Sector

Recommendations to the Private Sector			
ADSS.PS.1			
.1 Develop and implement incentives for business and industry technology partnerships with schools		→	

INFRASTRUCTURE FOR TECHNOLOGY

EXECUTIVE SUMMARY

The establishment of an infrastructure for technology is fundamental to undertaking many of the Actions and Recommendations that precede this section. In this plan for technology, the infrastructure consists of two complementary components.

The Components of an Infrastructure for Technology

One component focuses on technological aspects. Often called the "boxes and wires," these are the hardware and the connecting peripherals that cause the hardware to function properly, such as the network connections and the resulting communications capabilities. Also relevant are the software, including applications programs, such as graphics or spreadsheet, and the content, such as the TEKS.

The second — and equally important — component of the infrastructure for technology is the human infrastructure. This refers to the capabilities or proficiencies of those who use the technical components.

The two aspects work symbiotically to create communication and enhanced skills and knowledge among public education stakeholders. The ultimate result is networks of people and information made possible by networks of telecommunications.

Establishing a Comprehensive System

To achieve these networks, it is the responsibility of the Texas Education Agency to first take a leadership role in establishing the comprehensive state technology system that undergirds and makes possible the communications among students and educators, the data distribution and analysis, the just-in-time professional development, and the other key factors conveyed in this long-range plan for technology that are discussed in the previous sections.

Coordination with other state agencies, regional and local education agencies, and the private sector will be of paramount importance in determining connectivity and the technical, functional, and other standards for this system. Coordination will also be needed to ensure that access will be equitable statewide.

Concomitant with this effort will be the actions necessary to ensure that students and educators acquire the proficiencies they need to take advantage of the technology infrastructure. In the long term, the state will also need to develop policies regarding public access to the data and to the educational resources available through the infrastructure.

The Regional and Local Roles

Regional education service centers should take responsibility for participating in planning and supporting the technology infrastructure. Each center should also raise the level of expertise of educators and technical staff at the schools and districts in its use and maintenance.

It is at the local level where the greatest use and, perhaps, the greatest benefits will accrue. To reap these benefits, school districts will need to determine the funding mechanisms that best fit local conditions for acquiring,

maintaining, and recycling workstations and other technologies.

They will also benefit most by implementing the ratios of workstations to students and educators introduced above and by determining how best to deploy the workstations to ensure universal accessibility.

Many Roles in Technology and Education
It will be incumbent on institutions of higher education to prepare pre-service educators with the skills they need to integrate the technology infrastructure into teaching and learning, instructional management, professional development, and administration.

The private sector — the developers and vendors of the technology systems, the instructional materials, and the training and other services — is asked to work closely with the public education system to provide products appropriate for students, educators, and managers at favorable prices.

Finally, as conveyed in the previous sections, entire communities will benefit by seeking access to the wealth of information and services that will be available on the networks.

INFRASTRUCTURE FOR TECHNOLOGY

ACTIONS AND RECOMMENDATIONS

State

	Short-term 1997-98	Mid-term 1999-2002	Long-term 2003-2010
Actions by the Texas Education Agency			
IT.TEA.1-11			
.1 Take a leadership role in the development and implementation of a comprehensive state technology system providing voice, video, and data capabilities and ensuring equitable access by all districts and campuses		→	
.2 Establish and maintain a coordinating mechanism with the Department of Information Resources, Telecommunications Infrastructure Fund Board, General Services Commission, State Library, and other state agencies and associations, as appropriate	→	→	→
.3 Identify or develop compatibility and capacity guidelines and standards for technology and infrastructure in schools and for systems that support it	→	→	
.4 Review and revise compatibility and capacity guidelines and standards		→	→
.5 Provide means to support student and staff collaboration, including access, connectivity, information services, training, and support	→	→	→
.6 Ensure that educator and student workstation ratios are met		→	→
.7 Incorporate standards for students' and educators' technology proficiencies into the curriculum		→	
.8 Provide state funding of regional education service centers for information dissemination, preview centers, technical assistance for planning, support and management of state initiatives, and a clearinghouse for model and promising practices		→	→
.9 Report local technology infrastructure factors, including ratios of educators and students to workstations, for inclusion in the Academic Excellence Indicator System (AEIS)		→	→
.10 Provide leadership for replacement or repositioning of obsolescent technology	→	→	→
.11 Develop standards and policies for access by parents and community members to the technology infrastructure, including maintaining confidentiality of information, and providing access to data and learning resources		→	→

State (cont'd)

	Short-term 1997-98	Mid-term 1999-2002	Long-term 2003-2010
Recommendations to Other State Agencies			
IT.OSA.1-2			
.1 Participate in the development and implementation of a comprehensive state technology system with voice, video, and data capabilities		→	
.2 Establish full universal connectivity with state technical standards			→

Regional

Recommendations to Regional Education Service Centers			
IT.RESC.1-4			
.1 Design, install, and maintain a technology and telecommunications infrastructure for communications and service	→	→	→
.2 Maintain expertise for supporting schools, districts, and staff in planning for and using technology	→	→	→
.3 Provide a forum for regional collaboration	→	→	→
.4 Offer technical assistance to schools for technology planning and for integrating technology into all campus and district plans	→	→	→

Local

Recommendations to Local Education Agencies			
IT.LEA.1-5/15			
.1 Investigate multiple financial arrangements for securing and recycling workstations and other technologies	→	→	→
.2 Meet the technology equipment targets for students adopted in the *Long-Range Plan for Technology, 1988-2000* of a student-to-workstation ratio of 4:1	→		
.3 Meet the technology equipment target of a student-to-workstation ratio of 3:1		→	
.4 Meet the technology equipment target of a student-to-workstation ratio of 1:1			→
.5 Meet the technology equipment target of an educator-to-workstation ratio of 1:1	→		

Local (cont'd)

	Short-term 1997-98	Mid-term 1999-2002	Long-term 2003-2010
Recommendations to Local Education Agencies (cont'd)			
IT.LEA.6-15			
.6 Provide access to appropriately configured workstations to students and staff in libraries, school offices, and in other work areas, ensuring accessibility for disabled students and staff	→	→	→
.7 Integrate planning for technology into all classroom, campus, and district planning (TEC 11.252)	→	→	→
.8 Build community support through collaborative planning, education, public information, and other means	→	→	→
.9 Provide high-speed access to the Internet for students and staff	→	→	→
.10 Seek partnerships with public and private entities	→	→	→
.11 Seek external funding for the technology infrastructure	→	→	→
.12 Commit to participate in the comprehensive state technology system		→	
.13 Maintain or retain expertise for installing and supporting an appropriate technology infrastructure		→	→
.14 Replace or reposition obsolescent technology on a scheduled basis	→	→	→
.15 Provide and maintain an infrastructure for communications with parents and community members, including access to school news, educational resources, data, and personnel		→	→
Recommendations to Communities			
IT.COM.1			
.1 Develop parent and community access to existing and emerging networks to communicate with schools	→	→	→

Higher Education

Recommendations to Institutions of Higher Education			
IT.IHE.1-3			
.1 Acquire and maintain current technology for educator preparation facilities	→	→	→
.2 Meet or exceed national recommendations for infrastructure, faculty proficiencies with technology, and student access to learning and information resources by technology	→	→	→
.3 Establish conferencing systems, compatible with schools' systems, that meet state public school technical guidelines and standards			→

Private Sector

	Short-term 1997-98	Mid-term 1999-2002	Long-term 2003-2010
Recommendations to the Private Sector			
IT.PS.1-2			
.1 Provide favorable pricing and services to schools to support infrastructure	→	→	→
.2 Establish conferencing systems, compatible with schools' systems, that meet state public school technical guidelines and standards		→	→

Other Groups

	Short-term 1997-98	Mid-term 1999-2002	Long-term 2003-2010
Recommendations to Other Groups			
IT.OG.1			
.1 Access existing and emerging networks to communicate with schools, libraries, medical facilities, agencies, and other sources of information		→	→

GLOSSARY

Distance learning is that in which some materials and/or participants are not local.

Distributed learning is learning engaged by students, educators, staff, community members or others with the support of telecommunications technologies at school, home, business, or other site.

Educators are broadly defined as professional staff at or affiliated with a public school or district, including teachers, administrators, curriculum coordinators, librarians, and others.

Intelligent agents are machine-based entities that can carry out simple instructions from a user.

Just-in-time professional development refers to professional development resources that are available on-call through access to formal instruction, experts on-line, intelligent agents, and other resources.

Texas Essential Knowledge and Skills (TEKS) are statements of knowledge and skills and of Performance Descriptions that, in accordance with state statute, will be adopted by the State Board of Education to replace the essential elements. Knowledge and Skills address what all students should know and be able to do. Performance Descriptions are explanations of how students can demonstrate the knowledge and skills they have acquired.

Virtual relationships or items (as in virtual communities) are based on interactions or objects or representations that are in digital rather than in physical form.

Workstation - (Educator) A computer with transmission, productivity, and presentation capabilities for use by educators in teaching, management, and other professional tasks; can be desktop and/or portable, at local discretion. (Student) A computer with a range of capabilities, depending on local priorities, for use by students in classroom, library, or home use.

APPENDIX

ACCOMPLISHMENTS OF *THE 1988-2000 LONG-RANGE PLAN FOR TECHNOLOGY OF THE TEXAS STATE BOARD OF EDUCATION*

History

The original *1988-2000 Long-Range Plan for Technology* called for the establishment of a statewide electronic transfer system, expansion of integrated telecommunications systems, and a center for research in educational technology. The plan also set forth goals for Texas public schools for the use of technology in instructional environments. The original plan resulted in the passage of Senate Bill 650 by the 71st Legislature, Regular Session, which became Chapter 14 of the Texas Education Code.

Perhaps most significantly, $6 million was appropriated to begin implementation of the plan. This legislation was the first in the nation to appropriate funds exclusively for use of technology in schools.

Since the passage of that legislation, much work has been done to implement the Long-Range Plan for Technology. The original legislation called for the development of an electronic information system, which became the Texas Education Network (TENET); the development of an integrated telecommunications system, which became the Texas School Telecommunication Access Resource (T-STAR); and the creation of a center for educational technology, which became the Texas Center for Educational Technology (TCET). In addition, Technology Preview Centers and Training Programs were established at the twenty Education Service Centers across the state to provide planning support, technical assistance, technology staff development, and technology preview centers where the latest in instructional technology is available.

Subsequent legislation resulted in the funding of the Technology Allotment. This allotment provides approximately $30 per student annually to school districts in Texas. Since 1992, approximately $500 million has been distributed to schools to purchase hardware, software and provide training. As a result of the revision of the Texas Education Code, the Long-Range Plan for Technology and related initiatives are now part of Chapter 32 of the Texas Education Code.

Following is a timeline of the accomplishments toward meeting the goals of the *1988-2000 Long-Range Plan for Technology* and a chart of Current Status of Texas Technology Initiatives that gives an overview of the state initiatives that resulted from that plan. Biennial progress reports submitted to the legislature provide detailed information on each state initiative and the progress toward fulfilling the goals of the plan.

The Long-Range Plan for Technology, 1988-2000
Timeline of Events and Accomplishments

Sept. 1983-Aug. 1984	• HB 1304 calls for a long-range plan for technology • HB 246 mandates a computer literacy course at grades 7 or 8
Sept. 1984-Aug. 1985	• Software Advisory Committee (SAC) established
Sept. 1988-Aug. 1989	• The *Long-Range Plan for Technology, 1988-2000* adopted by the SBOE
Sept. 1989-Aug. 1990	• SB 650 authorizes statewide initiatives defined by the *Long-Range Plan for Technology, 1988-2000* • SB 1 establishes the Technology Allotment • Technology Preview and Training Centers established at Education Service Centers (ESC) • Textbook adoption process amended to include electronic media • First Technology Demonstration Sites Established • Advisory Committee on Technology Standards (ACTS) established by the SBOE • Texas Center for Educational Technology (TCET) established at the University of North Texas • Integrated Telecommunication Feasibility study completed
Sept. 1990-Aug. 1991	• First electronic textbook adopted by the SBOE • Textbook Proclamation 68 calls for electronic textbook only to be submitted for computer literacy • Texas Schools Telecommunications Access Resource (T-STAR) established • First 250 T-STAR satellite dishes installed in schools and ESCs • Texas Education Network (TENET) established • TENET established TENET Master Trainers Program • SAC recommended use of The Educational Software Selector (TESS)

The Long-Range Plan for Technology, 1988-2000
Timeline of Events and Accomplishments

Sept. 1991-Aug. 1992

- SB 351 includes technology funds in Foundation School Program
- Districts required to submit 5-year technology plans to TEA and DIR
- Technology Allotment Funds flow to districts
- 86 T-STAR satellite dishes installed in schools and training provided
- Technology funds support ESC Technology Preview Centers and Training Programs

Sept. 1992-Aug. 1993

- SB 7 includes technology planning in campus and district improvement plans
- SAC and ACTS combined to form Educational Technology Advisory Committee (ETAC)
- SB 5, Rider 61 calls for development of a statewide database of public school library holdings
- HB 183 and HB 1029 calls for establishment of technology demonstration sites - Projects for Educational Technology (PETs)
- First 8 Centers for Professional Development and Technology (CPDTs) established
- First T-STAR broadcasts from the William B. Travis Building
- First Annual TCET Symposium

Sept. 1993-Aug. 1994

- 22 planning grants awarded to 77 districts and their collaborators under Projects for Educational Technology
- 138 T-STAR grants for satellite dishes awarded to schools
- T-STAR Information and Training Center established
- First TENET mini-grants awarded to 32 teachers
- TENET announces Home Page on the Internet
- TENET hosts first State Networking Conference
- Second Annual TCET Symposium
- 6 Centers for Professional Development and Technology (CPDTs) established

The Long-Range Plan for Technology, 1988-2000
Timeline of Events and Accomplishments

Sept. 1994-Aug. 1995

- TENET Connectivity Grants awarded to 55 schools
- Second TENET mini-grants awarded to 19 teachers
- Creating Connections Consortium designated demonstration site under Projects for Educational Technology
- Texas Library Connection (TLC) established
- TLC full text pilot project begins
- TLC 30 charter districts join Union Catalog (statewide database)
- 531 T-STAR grants for satellite dishes awarded to schools
- Tri-State Multimedia (*Vital Links*) Project released
- First Affiliate broadcast on T-STAR
- Texas Education Telecommunication Network (TETN) implemented
- TCET receives $3.5 million in assets from Supercollider project to begin Super Collider Opportunities for Public Education (SCOPE)
- TCET Global Classroom series recognized by International Federation of Information Processing Societies
- TENET hosts second State Networking Conference
- Third Annual TCET Symposium
- ETAC members charged with writing the curriculum guidelines for the technology applications essential knowledge and skills

The Long-Range Plan for Technology, 1988-2000
Timeline of Events and Accomplishments

Sept. 1995-Aug. 1996

- 16 Planning grants awarded to 82 districts and their collaborators under Projects for Educational Technology
- 5 Implementation grants awarded to 10 districts and their collaborators under Projects for Educational Technology
- TLC Year 2 of Union Catalog adds 125 districts
- TLC full text pilot timeframe extended
- TETN electronic data transfer project begins
- 49 T-STAR grants for satellite dishes awarded to schools (bringing the total number to 1,054)
- T-STAR Studio B established providing two-way video teleconferencing facilities
- Four affiliates added to T-STAR programming
- TCET Project Electronic Emissary Web site receives national recognition by McKinley Group
- TCET web site listed as number 3 in Syllabus Web Top 40 Education Sites, selected by Syllabus Magazine
- Third round TENET mini-grants awarded to 34 teachers
- TENET project moved to Charles A. Dana Center at the University of Texas at Austin
- TENET receives EdNET Pioneer Award from Nelson B. Heller & Associates
- 7 Centers for Professional Development and Technology (CPDTs) established (bringing the total number to 21)
- First update to computer literacy adoption
- Technology Allotment moved to Textbook Fund
- Computing proficiency credit required for graduation as part of Recommended High School Plan
- Technology Applications curricular area becomes part of required curriculum
- One credit of technology applications required under all graduation plans
- Texas Task Force on Educational Technologies established to update the *Long-Range Plan for Technology, 1988-2000*

Current Status of Texas Technology Initia

Authorized Under Texas Education Code, Chapter 32

Initiatives	Description	Purpose	Focus	Location
TECHNOLOGY ALLOTMENT CONTACTS: Anita Givens Sr. Director Karen Kahan Ed. Tech. Specialist	Technology Allotment funds, established during the Sixth Called Session of the 71st Texas State Legislature, provide $30 per student for technology.	All school districts in Texas are eligible to receive a technology allotment, currently $30 per student, for the purchase of technology in support of the goals of *The Long-Range Plan for Technology*.	The allotment funds may be used for the purchase of electronic textbooks; technological equipment that contributes to student learning; and, to pay for training educational personnel directly involved in student learning in the appropriate use of electronic textbooks and for providing access to technological equipment for instructional use.	All school districts are receiving technology allotment funds.

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Current Status of Texas Technology Initia

Authorized Under Texas Education Code, Chapter 32

Initiatives	Description	Purpose	Focus	Location
TEXAS EDUCATION NETWORK (TENET) CONTACTS: Connie Stout Program Director Univ. of Texas at Austin Richard LaGow TENET Specialist	The Electronic Information Transfer System (TENET) provides telecommunications and related services to public school educators through an electronic network with resources that include on-line library catalogs, public databases, and instructional multimedia libraries.	The network provides cost-effective communications between school districts and TEA by offering the educators electronic mail, bulletin boards, computer conferencing and database access. Classroom teachers can use the network to access instructional materials to enhance classroom lessons.	Through collaborative efforts with educators in the state, the agency supports the use of telecommunications as an instructional application which extends learning beyond physical barriers and time constraints.	There are currently over 58,800 TENET accounts. Direct connections at each of the 20 regional education service centers have been established. Over 100 school districts have direct connections to TENET/Internet.

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Current Status of Texas Technology Initia

Authorized Under Texas Education Code, Chapter 32

Initiatives	Description	Purpose	Focus	Location
TEXAS SCHOOL TELECOMMUNICATION ACCESS RESOURCE (T-STAR) CONTACTS: Robert Young Program Director Keith Elliott T-STAR Network Development Kate Loughrey T-STAR Project Coordinator	T-STAR is a statewide satellite network which provides one-way video/ two-way audio communication services for school districts, regional education service centers, and the agency.	T-STAR allows school districts and regional education service centers access to distance learning courses, professional development training, and a variety of instructional television programming available via satellite.	T-STAR equipment at schools is designed to allow schools to receive satellite-delivered educational programming from a great variety of program providers. Current focus is to provide training and information to the schools on how to use the equipment, how to select appropriate programming for their local school, and how to effectively utilize the programs in the classrooms.	All 20 regional education service centers and over 1,000 school districts have installed or received funding for the purchase and installation of a T-STAR satellite system.

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Current Status of Texas Technology Initia

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Initiatives	Description	Purpose	Focus	Location
TEXAS CENTER FOR EDUCATIONAL TECHNOLOGY (TCET) CONTACT: Delia Duffey Program Director	The Texas Center for Educational Technology (TCET) is a research center located at the University of North Texas in Denton and works in partnership with the University of Texas at Austin. Other universities participate in collaborative research activities.	The mission of the TCET is to promote research and development collaboration between industry and education in order that technologies and applications can be created and adapted for integration into the public school system.	TCET sponsors applied research projects designed to increase understanding of the impact of technology on the teaching and learning process. TCET assists educators in developing new applications for existing technologies by creating collaboratives.	100% of districts and all 20 regional education service centers are TCET members.

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Current Status of Texas Technology Initia

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Initiatives	Description	Purpose	Focus	Location
TECHNOLOGY PREVIEW & TRAINING CENTERS CONTACTS: Appropriate Regional Education Service Center	Technology preview and training centers are located at regional education service centers to include equipment, software and courseware, and funded staff to provide in-service and technical assistance to districts on technology planning, products, services, and to demonstrate effective uses of technology.	Preview and training centers allow district personnel hands-on experience with exemplary instructional systems as well as hardware, software, courseware, and other services; in addition, they provide continual assistance to districts in planning for the effective use and integration of technology into their daily operations.	Preview and training centers serve as effective resources designed to increase the level of technology expertise in school districts. Preview and training center staffs assist districts in implementation of district technology plans as well as *The Long-Range Plan for Technology*.	100% of districts have services available through preview and training centers located at the 20 regional education service centers.

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Current Status of Texas Technology Initia

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Initiatives	Description	Purpose	Focus	Location
TEXAS EDUCATION TELECOMMUNICATIONS NETWORK (TETN) CONTACT: Carol Wesstrom TEA Site Manager	TETN is a statewide telecommunications network among the 20 regional education service centers and TEA providing compressed two-way video/audio and data transmission using dedicated T-1 lines with the capabilities to connect to schools and other public institutions.	TETN was established to provide a dedicated telecommunications infrastructure between regional education service centers and the Texas Education Agency addressing the expanded need to exchange information and improve communication.	TETN improves communications, reduces travel expenses and reduces staff travel time for schools, regional education service centers and TEA. TETN is also used for electronic transfer of school data between regional education service centers and TEA.	All 20 regional education service centers and TEA.

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Current Status of Texas Technology Initia

Authorized Under Texas Education Code, Chapter 32

Initiatives	Description	Purpose	Focus	Location
TECHNOLOGY DEMONSTRATION SITES:				
THE TRI-STATE MULTIMEDIA LEP PROJECT CONTACTS: Anita Givens Sr. Director	The California Department of Education, the Florida Department of Education, and the Texas Education Agency have joined together to co-develop a multimedia, curriculum-based learning package for the Limited-English-Proficient (LEP) student population.	*Vital Links* is an innovative multimedia U.S. History program. It is designed for use by middle grade students, teachers, and parents and is particularly appropriate for LEP student populations.	*Vital Links* is based on a contructivist approach to history. At its core are a series of investigative questions that students explore in order to gain in-depth understanding of the key concepts important in our nation's development.	Available to all school districts.

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Current Status of Texas Technology Initia

Authorized Under Texas Education Code, Chapter 32

Initiatives	Description	Purpose	Focus	Location
TEXAS LIBRARY CONNECTION (TLC) CONTACT: Gloria McClanahan Program Director	The Texas Library Connection (TLC) provides current, relevant information by identifying the physical location of books and resources of school libraries and by making available the full-text of commercial on-line databases.	The purpose of TLC is to insure equal access to current, relevant information to all citizens of its school communities, regardless of geographic location or district size.	TLC provides an integrated, statewide resource sharing system through which needed information resources are identified, accessed, and retrieved; facilitates library technical services; provides appropriate full text databases; enhances the ability of participating libraries to contribute to, and to participate in, local, state, and national resource sharing initiatives including TexShare and Project Link.	TLC is accessible to all Texas students and staff on the Texas Education Agency web site as well as on each of the Education Service Centers' web sites. Over 150 school districts have merged their holdings into over one million unique records. The participating districts have access to interlibrary loan and cataloging modules in addition to the public access catalog.
TECHNOLOGY DEMONSTRATION SITES: CONTINUED PROJECTS FOR EDUCATIONAL TECHNOLOGY CONTACT: Karen Kahan Program Director	Senate Bill 1, passed by the 74th Texas Legislature and codified as Texas Education Code, Section 32.035(a), calls for the agency to establish demonstration programs.	These demonstration programs shall: (1) investigate the uses, effectiveness, and feasibility of technologies for education, and (2) provide models for effective education using technology.	A focus of these projects, as authorized in TEC Section 32.035(b), is "to encourage participation by and collaboration among districts, regional education service centers, the private sector, state and federal agencies, non-profit organizations, and institutions of higher education."	School districts or collaboratives of school districts are eligible to apply.

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